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REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN

DUTCH BOY SITE
CHICAGO, ILLINOIS

PREPARED

BY

ENVIRONMENTAL STRATEGIES CORPORATION

MARCH 9, 1999

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(continued)

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Acronym List

ACM	asbestos-containing material
API	American Petroleum Institute
bgs	below ground surface
CGI	combustible gas indicator
EOC	Extent of Contamination
Environ	Environ International Corporation
EPA	U.S. Environmental Protection Agency
EP	extraction procedure
ESC	Environmental Strategies Corporation
E&E	Ecology and Environment, Inc.
Harza	Harza Environmental Services, Inc.
IAC	Illinois Administrative Code
IDPH	Illinois Department of Public Health
IEPA	Illinois Environmental Protection Agency
mg/kg	milligrams per kilogram
mg/l	milligrams per liter
NESHAP	National Emission Standard for Hazardous Air Pollutants
NL	NL Industries, Inc.
OSC	On-Scene Coordinator
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
RACM	regulated asbestos-containing material
RCRA	Resource Conservation and Recovery Act
RD/RA	Remedial Design/Remedial Action
SAIC	Science Applications International Corporation
Simon	Simon Hydro-Search, Inc.
TACO	Tiered Approach to Corrective Action Objectives
TCLP	Toxicity Characteristic Leaching Procedure
Toxcon	Toxcon Engineering Company, Inc.
UAO	Unilateral Administrative Order
XRF	X-ray fluorescence

1.0 Introduction

1.1 General

Environmental Strategies Corporation (ESC) on behalf of NL Industries, Inc. (NL) has prepared this Remedial Design/Remedial Action (RD/RA) Work Plan (Work Plan) for the Dutch Boy site in Chicago, Cook County, Illinois. The purpose of the Remedial Action is to mitigate and manage risks posed by lead present in shallow soil at the site. The objective of the Remedial Action is to reduce the threat to human health and the environment posed by surface soil containing concentrations of lead above the United States Environmental Protection Agency (EPA) established risk-based cleanup goal for lead of 1,400 milligrams per kilogram (mg/kg).

The RD/RA is submitted in accordance with the terms of the March 26, 1996, Unilateral Administrative Order (UAO)[1] issued to NL by the EPA. Specifically, the RD/RA is designed to implement the EPA-approved alternative to abate the risks associated with lead-containing soil at the site. The approved alternative was detailed in the Risk Management Plan prepared by Environ International Corporation (Environ), dated December 1998. This Work Plan has been prepared in accordance with guidance developed by the EPA Office of Emergency and Remedial Response[2].

1.2 Summary of Selected Alternative

The Risk Management Plan for the Dutch Boy Site (December 1998) detailed options for mitigating the risks associated with lead-containing soil at the site. The plan considered various alternatives to reduce the risks, compared costs and protectiveness of each alternative, and recommended an alternative to be implemented that was cost-effective and protective of human health and the environment. Alternative 4 from the Risk Management Plan was selected for the Remedial Action. This alternative consists of excavation, treatment, and disposal of all soil in the unpaved areas of the site and soil identified in the parkway area on the north and east sides of

[1] United States Environmental Protection Agency, (USEPA 1996). Administrative Order Pursuant to Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as Amended, 42 U.S.C. Section 9606(a), and Section 7003 of the Resource Conservation and Recovery Act, as Amended, 42 U.S.C. 6973. March 26, 1996.

[2] United States Environmental Protection Agency, (USEPA 1986). Superfund Remedial Design and Remedial Action Guidance, OSWER Directive 9355-0-4A. June 1986.

the site containing total lead concentrations greater than the EPA's risk-based cleanup criteria of 1,400 mg/kg. Approximately 4,500 cubic yards of lead-containing soils will be excavated and treated onsite by stabilization to eliminate the characteristic of toxicity (nonhazardous). The treated soil will be disposed of offsite at a landfill permitted under Subtitle D of the Resource Conservation and Recovery Act (RCRA). This alternative achieves the objective of the Remedial Action by eliminating the potential for direct contact and ingestion of lead in unpaved, onsite soils.

The paved areas of the site consist primarily of concrete slabs from former site buildings with some asphalt-paved areas. Portions of the concrete surfaces are cracked and in disrepair. NL is currently in discussions with the City of Chicago regarding how these areas will be addressed.

Two construction debris piles are present on the southern and southwestern portions of the site. The piles contain approximately 850 cubic yards of material. Each pile contains debris from the post-1980 demolition activities. Because the 800 cubic yard pile contains pieces of corrugated transite material containing asbestos at concentrations up to 11 percent, the pile is considered a regulated asbestos-containing material (RACM) under the National Emission Standard for Hazardous Air Pollutants (NESHAP). The removal action for this pile will include development of an asbestos abatement plan by an Illinois-certified project designer; implementation of proper removal methods, such as material wetting, containment and collection of water used for wetting, plastic lining of dumpsters, and proper disposal; monitoring of removal activities by an Illinois-certified project monitor; implementation of worker protective measures; and submission of a 10-day notification before removal work commences.

Nine underground storage tanks are present at the site. The available information indicates that most of the tanks contained linseed oil, which is not a regulated substance. Two of the tanks likely contained regulated substances but, due to their age, may be grandfathered. The storage tanks are located under the concrete slab on the west-central portion of the site and have an aggregate capacity of approximately 150,000 gallons. Liquids, solids, and sludges contained in the tanks were previously removed by the Illinois Environmental Protection Agency (IEPA). The underground storage tanks will be closed by removal during the Remedial Action.

NL is currently working with the owner (the City of Chicago) to determine the best mechanism(s) for the long-term management and control of the site. This could include mechanisms such as deed restrictions or other monitoring/control techniques to be implemented and controlled by the owner.

2.0 Site Description

2.1 Site Location and Description

The Dutch Boy site facility is located at 12000 to 12054 South Peoria Street and 901 to 935 West 120th Street, Cook County, Chicago, Illinois (Figures 1 and 2, Appendix A). The site comprises 5.2 acres and is situated in a primarily industrial area. It is bound to the north by West 120th Street, to the east by South Peoria Street, to the south by rail lines of the Illinois Central Gulf Railroad, and to the west by an empty lot.

There are no buildings standing at the site although concrete building slab foundations cover much of the site. Approximately 75-percent of the site is under concrete cover, approximately 5-percent is under asphalt cover, and the remaining 20-percent is soil covered. The concrete slabs are believed to be up to 1-foot thick. The unpaved areas run in strips from north to south along the western edge of the property and extend to the southeast corner of the site. The unpaved areas likely are associated with the former railroad spurs that crossed the property.

2.2 Site History

From 1906 to 1980, the site was used to manufacture and refine white lead (i.e., lead carbonate) and lead oxide for lead-based paints and other lead-related products. No manufacturing has been conducted at the site since 1980. Based on previous reviews of Sanborn maps and historical aerial photographs, building demolition occurred at the site from the mid-1980s through 1996.

Various industrial activities have been conducted in the immediate vicinity of the site, including an aluminum foundry, metal machining shops, vehicle and heavy equipment maintenance and storage, junkyards, coal yards, and other metal treatment, forging finishing, and pickling operations. However, most of the properties surrounding the site are currently abandoned or vacant, it is likely that historic activities at these facilities have influenced lead concentrations in soils in the vicinity of the Dutch Boy site.

2.3 Topography

The site surface is generally flat. Most of the site is either at ground surface or elevated approximately four feet to loading-dock level. The ground elevation at the site is approximately 610 feet above mean sea level (United States Geological Survey 7.5' Blue Island, Illinois Quadrangle, 1993). Area topography generally slopes to the south towards the Little Calumet River located over 1 mile south of the site.

2.4 Summary of Previous Investigations

Environmental investigations began at the site in 1986 with an IEPA-conducted removal action. This removal was done in three phases. IEPA removed and disposed of surficial solids, both suspected and known to contain lead and asbestos during Phase I in June 1986.

IEPA sampled, analyzed and disposed of liquids, solids and sludges contained in all aboveground and underground storage tanks during Phase II in November 1986. IEPA also removed and disposed of all existing process and production equipment, baghouses, mixing tanks, screw conveyors, hoppers, masonry rubble, asbestos, and debris located in and around the building. The freestanding walls of the buildings were demolished during Phase II. IEPA assessed the structural integrity of the underground storage tanks and concluded that they were structurally sound and did not leak during Phase III in 1987. IEPA also sampled and analyzed soil for lead. Results indicated that 130 cubic yards of soil on and adjacent to the site contained Extraction Procedure (EP) toxicity extract lead concentrations greater than 5 milligrams per liter (mg/l) and approximately 140 cubic yards of soil contained greater than 1 percent lead. An EP toxicity extract lead concentration equal to or greater than 5 mg/l was defined as a hazardous waste under the RCRA regulations in effect at that time. The soil was not removed.

In June 1987, Toxcon Engineering Company, Inc. (Toxcon) conducted a field investigation at the site on behalf of NL. Samples were collected at 34 locations onsite and in the parkway across the street from the site. A soil sample taken from the northeast portion of the site contained a total lead concentration of 11,400 mg/kg. A second sample taken from the west side of the site contained 50,000 mg/kg of total lead. This second sample also had an EP toxicity extract lead concentration of 41 mg/l. In addition, analysis of a third sample taken from the parkway northeast of the site had an EP toxicity lead extract concentration of 4.6 mg/l. Based on these sample results and discussions with IEPA, Toxcon conducted additional field sampling in February 1988 and concluded that one onsite area and two offsite areas contained EP toxicity extract lead concentrations greater than 5 mg/l.

In 1991, EPA's contractor, Ecology and Environment, Inc. (E & E) conducted a reconnaissance at the Dutch Boy site. E & E observed small piles of general household and construction refuse scattered over the site. Since abandoned building structures containing potentially hazardous substances and lead-containing soils surrounding these structures were still present, E & E concluded that release of hazardous substances to the air was still a potential threat to human health. E & E recommended that the site be secured to prevent access by the public and that samples of the building structures and soils be taken to determine whether the release of hazardous substances from the site posed a potential threat to the community.

On August 10, 1993, EPA, IEPA and E & E conducted a site assessment of the Dutch Boy property. No soil piles or exposed soils were identified at the site and no soil samples were collected. On August 25 and 26, 1993, Simon Hydro-Search, Inc. (Simon) conducted an environmental assessment of the site on behalf of NL. Eleven soil samples were collected from seven onsite locations. In samples from the area of the loading dock and railroad spur on the west side of the site, total lead concentrations as high as 45,700 mg/kg and Toxicity Characteristic Leaching Procedure (TCLP) lead extract concentrations as high as 694 mg/l were measured. In the road outside the northeast corner of the site, a total lead concentration of 19,200 mg/kg and a TCLP lead extract concentration of 98.4 mg/l were measured in a sample. A TCLP extract lead concentration equal to or greater than 5 mg/l is defined as a RCRA hazardous waste (hazardous waste code D008).

On May 10, 1994, Harza Environmental Services, Inc. (Harza) conducted a site investigation on behalf of the City of Chicago. Harza collected and analyzed 13 wipe samples and 13 scrape samples from the former 3-story mill building at the site. Seven of the 13 wipe samples and 8 of the 13 scrape samples met the Illinois Department of Public Health (IDPH) definition of a lead-bearing substance. Six soil samples collected from depths between 6 and 15 feet below ground surface (bgs) were analyzed for TCLP lead. One other soil sample was collected at a depth of 1.0 to 2.5 feet bgs. All soil samples had TCLP lead concentrations at or below the 5.0 mg/l RCRA concentration for hazardous waste.

On June 8, 1995, an EPA on-scene coordinator (OSC) and staff from E & E and Harza conducted another site assessment. Six soil samples were collected and analyzed for lead. Total lead was detected in onsite soils at concentrations ranging from 1,540 mg/kg to 31,700 mg/kg. A total lead concentration of 21,200 mg/kg was reported in a sample collected from the east side of the building structure near a fire hydrant. A total lead concentration of 31,700 mg/kg was reported in another sample collected from the east side of the northernmost loading dock on the west side of the site. This sample also had a TCLP lead extract concentration of 351mg/l. In an August 25, 1995, Site Assessment Report, E & E concluded that the site should be secured and an extent of contamination study should be conducted to determine the extent of lead-containing soil at the site.

In February 1996, EPA's contractor, Science Applications International Corporation (SAIC), reviewed the available reports on the site and assessed the likelihood of a potential release of lead from the historic manufacturing processes. SAIC calculated that approximately 166 tons of lead were released into the air between 1906 and 1980 from the historic manufacturing activities. Assuming that each of the manufacturing processes site had a short stack, low exit velocity, and low temperature, SAIC predicted that most of the emissions would have settled out within several hundred feet.

In March 1996, EPA prepared an interim final risk assessment for the site. The risk assessment assumed that the site would be used for an occupational scenario and that it would not be frequented by small children. Based on these assumptions, EPA calculated a risk-based clean-up goal of 1,400 mg/kg as the average concentration of lead in soil, which would allow for risks within an acceptable range. In addition, the risk assessment recommended that any hot spots which are significantly higher than the 1,400 mg/kg be remediated even if, when averaged, they contribute to an acceptable range of risk.

In 1997 an Extent of Contamination (EOC) survey was conducted for the site by Environ Corporation. The primary objective of the EOC survey was to evaluate the vertical and horizontal extent of lead in soil at the site and in its vicinity. Over 350 samples from 151 locations were collected and analyzed. The extent of onsite soils containing lead at concentrations greater than the 1,400 mg/kg average risk-based cleanup criteria was found to be generally limited to the western, unpaved portions of the site. The areas most affected are the former rail spurs leading to the loading dock in the northwestern portion of the site. Surface soil (i.e., 0.0 to 0.2 feet bgs) lead concentrations in the rail spur area range from 5,000 to 10,000 mg/kg.

Selected soil samples also were analyzed for several other parameters (e.g., asbestos, petroleum hydrocarbons, and volatile organic compounds) to evaluate their impact on remedial technologies for the lead-containing soil. Diesel-related petroleum hydrocarbons were identified in soil samples collected near the loading dock in the northwest portion of the site. The petroleum-hydrocarbon impacted soil is confined to the immediate vicinity of the underground storage tanks. Based on the concentrations of hydrocarbons detected at the site, it is unlikely that they will affect the technology selected to address lead-containing soil.

3.0 Description of Remedial Action

The Remedial Action selected for the Dutch Boy site consists of the following components (in order of planned execution):

- Underground storage tank closures
- Debris pile removal and offsite disposal
- Lead-containing soil excavation and sampling
- Backfilling and compaction of excavated areas
- Soil stabilization
- Offsite disposal
- Address damaged concrete surfaces (if warranted)
- Implementation of maintenance program (note: May be implemented and controlled by owner)

Appendix B contains the design specifications detailing the requirements for implementation of the Remedial Action. The Division 1 specifications detail the general requirements for the management and execution of the Remedial Action. The Division 2 specifications detail the specific tasks required to execute the Remedial Action as follows:

- Section 02071 - detailed requirements and procedures for closure of the underground storage tanks.
- Section 02110 - detailed requirements for preparing the site including clearing, grubbing, and chipping of vegetative matter from the excavation areas.
- Section 02205 - detailed requirements for soil materials that shall be used as unclassified fill for the backfill and suitable material for topsoil.
- Section 02211 - detailed grading requirements to bring grades to proper elevations using on site material.
- Section 02216 - detailed requirements for the geotextile to be used in the stabilized construction entrance.
- Section 02222 - detailed requirements for excavation of soil from the unpaved areas of the site.
- Section 02223 - detailed requirements for backfilling and compacting the excavation areas and underground storage tank areas.
- Section 02274, 02275, and 02276 – detailed requirements for erosion and sedimentation controls to be implemented at the site.

- Section 02445 - detailed requirements for stabilizing the excavated lead-containing soil that exhibits the characteristic of toxicity at the site.
- Section 02513 - detailed requirements for the asphalt caps to be placed over damaged concrete surfaces at the site, if warranted.

Appendix C (provided under separate cover) contains design drawing sheets 1 through 5 which detail plans for completion of the Remedial Action. Sheet 1 is a title sheet for the drawing set. Sheet 2 provides a general site plan of the property. Sheet 3 provides plans for site preparation work and erosion and sediment control measures to be implemented during the Remedial Action. Sheet 4 shows the areas to be excavated, the onsite treatment areas, and the areas to be capped. Sheet 5 provides details for erosion and sediment control measures, soil treatment, excavation restoration, and asphalt placement (if warranted).

3.1 Site Preparation

Site preparation will consist of implementing erosion and sedimentation control measures. The specifications presented in the U.S. Department of Agriculture, Natural Resource Conservation Service's guidance titled "Illinois Urban Manual: A Technical Manual Designed for Urban Ecosystem Protection and Enhancement" were used as guidelines for the erosion and sediment control measures at the site. A stabilized construction entrance will be constructed at the north site gate; site ingress and egress is not anticipated from the southeast gate. This control measure is designed to mitigate sediment transport onto public roads. A silt fence will be placed along various portions of the site perimeter not covered with concrete surfaces. Straw bale fences will be placed along various portions of the site perimeter with concrete surfaces. These control measures are designed to intercept and detain sediment from disturbed areas.

3.2 Underground Storage Tank Closures

Nine underground storage tanks are present along the western side of the site. The tanks are empty and reportedly have an aggregate capacity of approximately 150,000 gallons and stored linseed oil and petroleum products. In June 1986, the IEPA disposed of liquids, solids, and sludges contained in all tanks at the site. Therefore, the storage tanks are presumed empty. In 1987, IEPA assessed the structural integrity of the tanks and concluded that they were structurally sound and did not leak.

The available information indicates that most of the tanks contained linseed oil, which is not a regulated substance. Two of the tanks likely contained regulated substances but, due to their age, may be grandfathered. The underground storage tanks will be closed by removal in accordance with the requirements of Title 35 of the Illinois Administrative Code (IAC), Subtitle G, Part 731, Underground Storage Tanks; and Part 732, Petroleum Underground Storage Tanks. Removal of the tanks will be performed in accordance with the American Petroleum Institute (API) Bulletin No. 1604, Recommended Practice for Closure of Underground Storage Tanks. Additionally, the underground storage tank closure requirements of the City of Chicago, Department of Environment, and the Office of the Illinois State Fire Marshal, Division of Petroleum and Chemical Safety, will be followed.

3.2.1 Underground Storage Tank Removal

A minimum of thirty days prior to removal of the underground storage tanks, an "Application for Permit to Remove Underground Storage Tanks for Petroleum and Hazardous Tanks" will be filed with the City of Chicago, Department of Environment. The application will include information on the site, the tank owner, and the tanks. The application will be submitted by the tank removal contractor. The removal contractor will be registered with the State of Illinois Fire Marshall's Office and the City of Chicago, Department of Environment. Removal of the tanks will not proceed until the permit to remove has been received.

Before excavation, product present in lines will be drained back to the tanks and removed. Excavation of the tanks will begin after an exclusion zone is established around the removal area. The concrete slab above the tanks will be removed and placed with the construction debris to be disposed of offsite. The soil above the tanks will be excavated to expose the tops of the tanks and the fill and vent lines. This soil will be placed in the treatment area to be constructed for onsite stabilization of lead-containing soil (Section 3.4.2). The soil will be covered with a minimum of 10-mil thick plastic sheeting.

Once the tops of the tanks are exposed, all piping will be drained (if necessary) and removed. Exposed pipe trenches will remain open until a Tank Specialist from the City of Chicago inspects them. Liquids collected in the storage tanks, if any, will be removed using an explosion-proof pump and stored in a temporary aboveground storage tank equipped with secondary containment.

The atmosphere in the underground storage tanks and the excavation area will be monitored with a Combustible Gas Indicator (CGI), for flammable or combustible vapor concentrations until the tanks are removed from both the excavations and the site. Monitoring of the storage tanks will be performed at three levels in the tanks (bottom, middle, and top). Flammable vapors will be purged from the tanks using either solid carbon dioxide (dry ice), compressed air, or a diffused air blower. Air will be monitored during purging of the tanks. After the tanks have been vented, all accessible tank holes will be plugged or capped, leaving one 1/8-inch diameter vent hole. Excavation will then continue around the tanks to prepare them for removal.

A Tank Specialist from the City of Chicago will be onsite before cutting and cleaning operations or removal of the tanks proceeds. Once a Tank Specialist is onsite, the storage tanks will be removed from the excavations using a hydraulic excavator or crane. The ends of each storage tank will be cut open (a minimum of 9 square feet on each opposite end) on the day it is excavated to prevent additional vapors from accumulating in the tank. The tanks will be removed offsite for proper recycling at a scrap metal dealer. A certificate of destruction will be obtained verifying disposal of the tanks. A Notification for Underground Storage Tanks form will be filed with the Office of the Illinois State Fire Marshal, Division of Petroleum and Chemical Safety within 30 days after the closure of the storage tanks. The notification form will serve to document closure of the tank.

3.2.2 Confirmatory Sampling

After the storage tanks have been removed, soil samples will be collected from each tank excavation. In accordance with the IEPA's Leaking Underground Storage Tank Manual, Fall 1991, a minimum of six soil samples will be collected (one from each side and end wall and one from the bottom representative of each tank end) from individual tank excavations. If the tank excavations are contiguous, soil samples will be collected from the excavation walls at a frequency of 1 per 10 linear feet. Two soil samples will be collected from the base of each tank excavation. Samples from the excavation side and end walls will be collected from points along the wall which were parallel to the lower third of the tank. Samples collected from the excavation bottom will represent the location of the tank invert and will include both tank ends. If groundwater is encountered, a grab sample will be collected to assess the potential for impacts.

An investigation of the distribution lines, if present, will also be performed. If a release is identified along former distribution lines, soil samples will be collected. Samples will be collected from below the area where the lines had existed at approximately 20-foot intervals.

Soil and groundwater will be analyzed for benzene, ethylbenzene, toluene, and xylenes by EPA Method 8260, polynuclear aromatic hydrocarbons by EPA Method 8310 and total lead by EPA Method 6010B. Samples will be collected and managed in accordance with the Quality Assurance Project Plan (QAPP), prepared under separate cover. Analytical results will be compared to IEPA's Tiered Approach to Corrective Action Objectives (TACO) IAC 35, Part 742.

If the analytical results do not indicate a release, all storage tank excavations and trenches will be backfilled using offsite backfill. Off-site backfill will be non-saturated, well-graded soil provided by a local source, and will be certified free of hazardous substances and deleterious material, such as large roots, rocks, or vegetative matter. The backfill will be placed into the excavations in maximum 8-inch lifts and compacted at each lift.

3.2.3 Release Reporting/Response Actions

If it is determined through sampling and laboratory analysis that a release from an underground storage tank has occurred, the Illinois Emergency Management Agency will be notified within 24 hours of the determination. After reporting the release, response actions and assessments will be conducted as specified in IAC 35, Subtitle G, Part 732.

3.3 Debris Pile Removal and Disposal

Two construction debris piles are present on the southern and southwestern portions of the site. The piles contain approximately 850 cubic yards of material. Each pile contains debris from the post-1980 demolition activities. The Extent of Contamination Survey, dated November 19, 1997, prepared by Environ, identified asbestos-containing material in the 800 cubic yard debris pile. Specifically, two of four samples collected from the pile were determined to contain greater than 1 percent asbestos. The 800 cubic yard pile is therefore considered a regulated asbestos-containing material (RACM) under the National Emission Standard for Hazardous Air Pollutants (NESHAP). The removal action for this pile will include development of an asbestos abatement plan by an Illinois-certified project designer; implementation of proper removal methods, such as material wetting, containment and collection of water used for wetting, plastic lining of dumpsters, and proper disposal; monitoring of removal activities by an Illinois-certified project monitor; implementation of worker protective measures; and submission of a 10-day notification before removal work commences. The concrete excavated during the underground storage tank removal as well as the asphalt present in the southeast and northwest corners (reference Section 3.4.1) of the site will be disposed of as demolition debris with the 50 cubic yard debris pile.

3.4 Soil Remediation

Remediation will consist of excavation, onsite stabilization, and offsite disposal of soil in the unpaved areas of the site, soil identified in the parkway area, and accessible sediments in the basement of the former mill building containing lead concentrations greater than the EPA's risk-based cleanup criteria of 1,400 mg/kg. Approximately 4,500 cubic yards of lead-containing soils will be excavated. The excavated soils will be placed in 100-cubic yard stockpiles within the treatment area. Each pile will be sampled and tested for the lead toxicity characteristic. If the sample contains less than 5.0 mg/l lead as measured in the TCLP extract, the soil will be transported to a Subtitle D landfill for proper disposal. If the sample contains more than 5.0 mg/l lead as measured in the TCLP extract, the soil will be treated onsite by stabilization with a reagent to render it nonhazardous. Treated soil will be sampled to verify successful treatment and disposed of offsite at a Subtitle D landfill.

Unless significant delays are encountered during the removal of the underground storage tanks or the debris piles, soil remediation will not begin until the underground storage tanks and debris piles have been removed from the site.

3.4.1 <u>Excavation Plan</u>

As presented in the Risk Management Plan, lead was detected above the 1,400 mg/kg threshold in most borings in the unpaved areas of the site. Following removal of the soils shown on Sheet 4 of the Drawings, a sampling program will be conducted to verify that the lead concentration remaining in the unexcavated soils, to a maximum depth of 4 feet below ground surface, is less than 1,400 mg/kg.

Excavation will begin in the southeast corner of the site near Peoria Street and proceed to the northwest corner of the site near 120th Street. In the southeast corner of the site is an asphalt surface covering approximately 11,000 square feet; in the northwest corner of the site is an asphalt surface covering approximately 5,400 square feet . The asphalt cover will be removed prior to excavation and disposed of offsite with the debris piles. The initial excavations will proceed to the depths below existing grade indicated on Sheet 4 of the Drawings. Excavated soil will be moved to the treatment area to be constructed in the north-central portion of the site.

An X-ray fluorescence (XRF) lead detector will be used to screen soil samples on site to aid in determining whether the risk-based criteria have been attained. Once XRF analysis indicates that the risk-based criteria have been attained, confirmatory soil screening samples will be collected for laboratory analysis. Soil samples to confirm attainment of the risk-based criteria will be collected from the base of the excavations at a frequency of 1 per 1,000 square feet (i.e. 56 samples). Attainment of the cleanup criteria will be confirmed by base samples only; side wall samples will not be collected due to the impracticability of excavating beneath the building slabs. The samples will be analyzed for total lead by EPA Method 6010B on an expedited one-week turnaround time basis. Once laboratory analysis has confirmed the attainment of cleanup criteria or the excavation depth has reached four feet, the excavations will be backfilled. If the cleanup criteria are not met, additional excavation in specific "hot-spot" areas will be conducted to attain the risk-based criteria of 1,400 mg/kg lead. Laboratory analysis of samples collected from areas requiring additional excavation will be analyzed on an expedited 24-hour turnaround time basis to facilitate backfilling activities. All sample collection, handling, and management will be in accordance with the QAPP.

One sediment sample was collected from within the sub-basement of the former mill building during the 1997 EOC Survey. That sample (SS57) consisted of silty mud that apeared to have accumulated through run-off and deposition from areas within or surrounding the former mill building. Total lead was detected in the sample 25,000 mg/kg. The sediment identified in the sub-basement of the building will be removed for treatment.

3.4.2 Soil Stabilization and Disposal

The objective of the soil stabilization is to eliminate the presence of soluble lead in soil to concentrations below the regulatory TCLP concentration of 5.0 mg/l. Specifically, lead-containing soil will be stabilized such that the TCLP lead extract will not exceed 5.0 mg/l. Treatment to this concentration will allow the stabilized soil to be disposed of as nonhazardous waste at a Subtitle D landfill. Material is considered characteristically hazardous for lead toxicity if concentrations of lead in TCLP-generated extract meet or exceed 5.0 mg/l.

A pug mill stabilization system will be used which provides a safe, reliable method to treat lead-containing soil so that the treated material meets the performance criteria. The stabilization system will include control apparatus necessary to meet local, state, and federal regulations for air emissions and fugitive dust. The stabilization system will also meet applicable state and local noise pollution control regulations.

Stockpiles will be made for storing lead-containing soil prior to and following treatment. The stockpiles will be constructed in 100 cubic yard units and will be located on the concrete building slab in the central portion of the site as shown on Sheet 5 of the Drawings. The stockpiles will be placed under an impermeable geomembrane cover with a minimum thickness of 10 mils. The stockpiles will be covered to eliminate concerns for precipitation entering the stockpiles.

The untreated stockpiles will be sampled for TCLP lead at a frequency of 1 per 100 cubic yards. Those stockpiles that are found to be nonhazardous without treatment will be disposed of at a Subtitle D landfill, without stabilization.

Prior to full-scale operations, a field demonstration will be performed. At least 100 cubic yards of lead-containing soil will be processed and tested for volume increase and TCLP lead. Two representative samples will be collected from the treated material for analysis. The full-scale processing equipment will be used for the field demonstration. Reagents, mix ratios, and mixing procedures used during the field demonstration will be the same as those used for the remainder of the Remedial Action. The lead-containing soil used for the field demonstration will be obtained from the southeast portion of the site where excavation is planned to begin. Before performing the field demonstration, lead-containing soil to be used in the demonstration will be tested for total lead by EPA Method 6010B to verify that it is representative of site conditions (total lead concentrations greater than 1,400 mg/kg). If the treated material produced during the field demonstration is determined to be characteristically hazardous for lead toxicity as determine by the TCLP test, an equal quantity of the same type of material which failed shall be treated using a new mix design. If there is a significant discrepancy in the analytical results for the two representative samples, two additional samples of treated material will be collected for laboratory analysis and comparison.

The estimated increase in volume resulting from treatment will be determined during the field demonstration test. Volume increase will be determined by comparing the volume of *in situ* material to be treated to the volume of treated material using the following formula:

$$B = 100 \times |(1+R)(D\ in\ situ / D\ treated) - 1|$$

B= Volume increase in percent.
D *in situ*= Dry unit weight of *in situ* waste.
D treated= Dry unit weight of treated material.
R= Dry weight ratio of solidifying agent to waste.

After the field demonstration has been performed and the efficacy of the treatment system and mix design to meet the treatment criteria has been shown, full-scale treatment will proceed. During full scale operation, mixing time, mixing speed, and amounts of lead-containing soil, reagents, and water added to each batch will be documented. Mixing time, mixing speed, and batch proportions will be conducted at the rates and volumes established during the field demonstration.

The TCLP test is not amenable to real time quality control because of the time required to perform the test. Therefore, it is preferable to minimize the number of TCLP tests performed and to maintain quality control of the stabilization process by verifying that the mix design works during the field demonstration and maintaining quality control by monitoring batch proportions and mixing time. Real time indicator tests such as pH, specific conductance, mix temperature, and water content will be used as quality control tools to verify uniform mixes.

Treated material will be separated into stockpiles for post-treatment testing. Tests for TCLP lead will be performed at a frequency of 1 per 500 cubic yards of material. Stockpile sizes will be equal to or less than the quantity pertaining to the most frequent quality control test. Samples for post-treatment testing will generally be collected immediately after treatment. This will eliminate the need to remove samples from the treated mass after it has cured. Reprocessing and retesting shall be performed on treated material that is determined to be characteristically hazardous for lead toxicity as determined by TCLP testing. Treated material determined to be nonhazardous by TCLP testing will be transported offsite for disposal.

3.4.3 Site Restoration

Excavations will be backfilled to approximate pre-excavation elevations and graded to drain using offsite backfill. Off-site backfill will be non-saturated, well-graded soil provided by a local source, and will be certified free of hazardous substances and deleterious material, such as large roots, rocks, or vegetative matter. At locations where lead contamination exceeding 1,400 mg/kg extends below four feet, a barier such as snow fencing will be placed at the bottom of the excavation prior to placement of backfill. The backfill will be placed into the excavations in maximum 8-inch lifts and compacted at each lift. A vegetative cover will be established upon completion of backfilling.

3.5 Possible Asphalt Cap Placement

Various portions of the former building slab at the site do not provide a complete barrier to direct contact with lead-containing soils because of cracks and holes. NL is currently in discussions with the City of Chicago regarding how these areas will be addressed. A possible option is the placement of asphalt caps over damaged areas. If asphalt caps are used at the site, asphalt caps will be placed in the areas shown on Sheet 4 of the Drawings. The caps would consist of a 2–3 inch thick surface of compacted asphalt pavement.

3.6 Maintenance

NL is currently negotiating with the owner relative to long-term maintenance of the perimeter fencing, soil cover, and asphalt cover (if placed).

4.0 Health and Safety

All work specified in this Remedial Design/Remedial Action Work Plan will be conducted in accordance with the Project Health and Safety Plan provided in Appendix G. This plan will apply to ESC site personnel only. All Contractor personnel shall be required to adhere to a separate Health and Safety Plan that is substantially consistent with ESC's plan and is commensurate with the work and activities that will be completed by the Contractor. The Contractor's Health and Safety Plan will be submitted to ESC for approval prior to initiating the Remedial Action field work.

During execution of the Remedial Action, trucks transporting stabilized material offsite for disposal will be routed to avoid residential neighborhoods. Specifically, trucks will be directed north on South Peoria Street to West 119th Street. Trucks will proceed west on West 119th Street to Interstate Highway 57.

5.0 Permits and Approvals

ESC reviewed all potentially applicable State and local codes and regulations to determine the permitting requirements for implementation of the Remedial Action. An installation permit will be required by the City of Chicago, Department of Environment. A water permit will be required by the City of Chicago, Water Department. A right-of-way permit will be required by the City of Chicago, Department of Transportation. An excavation permit may be required by the City of Chicago, Building Department. The Remedial Design Drawings will be submitted to the Building Department for a determination as to whether an excavation permit is necessary. No other specific construction permitting or erosion and sediment control permitting requirements are known to apply to the proposed Remedial Action. While erosion and sediment control permits are not required for the project, erosion and sediment control guidelines from the U.S. Department of Agriculture, Natural Resources Conservation Service (USDA 1995) for the state of Illinois will be implemented during the Remedial Action. ESC has specified erosion and sediment control measures for the Remedial Action as shown on Sheet 3 of the Drawings (Appendix C).

6.0 Project Organization

The organizational structure for implementing the Remedial Action is shown on Figure 3, Appendix A. ESC is the principal consultant to NL and is responsible for the performance of all services required to implement the Remedial Action. James Bulman, Senior Vice President of ESC, is ESC's Project Director. He has the authority to commit the firm's resources to accomplish the project objectives. He has ultimate responsibility for ESC and the Contractor's performance and with the Project Manager from the ESC management team for the project.

ESC's Project Manager, Gilbert Gabanski, is responsible for the day-to-day direction and management of all ESC's activities as well as of ESC's contractors. Mr. Gabanski has the responsibility and authority to procure the necessary support services and equipment for implementing the Remedial Action. He has prime responsibility for scheduling, technical matters, and reporting all of ESC's activities and will report directly to the Project Director.

ESC's Engineer of Record, John Black, P.E., is responsible for the engineering design and specifications for the Remedial Action. He is an Illinois-registered Professional Engineer. He will ensure that Remedial Action work is performed in strict compliance with the approved designs and specifications. He has the authority to halt or reject work that does not meet the requirements of the engineering design and specifications.

ESC's Quality Assurance Officer (QAO), John Johnson, is responsible for all aspects of implementing the Quality Assurance Project Plan (QAPP) related to this Remedial Action. He will coordinate with the ESC Project Manager and QAO's of all contractors. He will report directly to ESC's Project Manager or Project Director when corrective action is required as a result of compliance performance audits.

ESC's Health and Safety Officer, Craig Ramich, is responsible for preparing and ensuring that the Health and Safety Plan is followed. He will ensure that all Remedial Action activities are performed in a safe manner to eliminate danger to personnel performing the field activities. He will coordinate with the ESC Project Manager and contractors regarding all procedures related to health and safety. He will report directly to ESC's Project Manager and file injury reports, as required.

7.0 Project Schedule and Progress Reporting

Appendix E presents a project schedule for completion of the proposed Remedial Action. This schedule is subject to change if the extent of lead-containing soil requiring excavation and treatment under this Remedial Action increases.

ESC will submit monthly progress reports to EPA outlining the activities performed during the previous month. Reports will be submitted during the Remedial Action activities. All monthly reports will include the following:

- Description of activities completed during the reporting period;
- Description of problems or potential problems encountered;
- Description of activities scheduled for the next reporting period;

Based on the scheduled construction start date of April 30, 1998, the first monthly report will be submitted to EPA in early June 1998.

Within 60 calendar days after completion of the Remedial Action, ESC will submit a summary report to the EPA detailing the activities performed during the Remedial Action. The report will be prepared in accordance with Section 300.165 of the National Oil and Hazardous Substances Pollution Contingency Plan. The report will include an estimate of total costs incurred in implementing the Remedial Action, a listing of the quantities and types of materials removed, a discussion of removal and disposal options considered for those materials, a listing of the ultimate destinations of those materials, a presentation of the analytical results of all sampling and analyses performed, and accompanying appendices containing all relevant documentation generated during the Remedial Action (e.g., manifests, invoices, bills, contracts, and permits.) The report will also include a certification of its truth, accuracy, and completeness.

8.0 References

American Petroleum Institute (API 1996). API Recommended Practice 1604. Closure of Underground Petroleum Storage Tanks, Third Edition. March 1996

Environ Corporation. (Environ, 1997). Draft Extent of Contamination Survey, Dutch Boy Site, Chicago, Illinois. November 19, 1997.

Environ International Corporation. (Environ, 1998a). Risk Management Plan, Dutch Boy Site. December 1998.

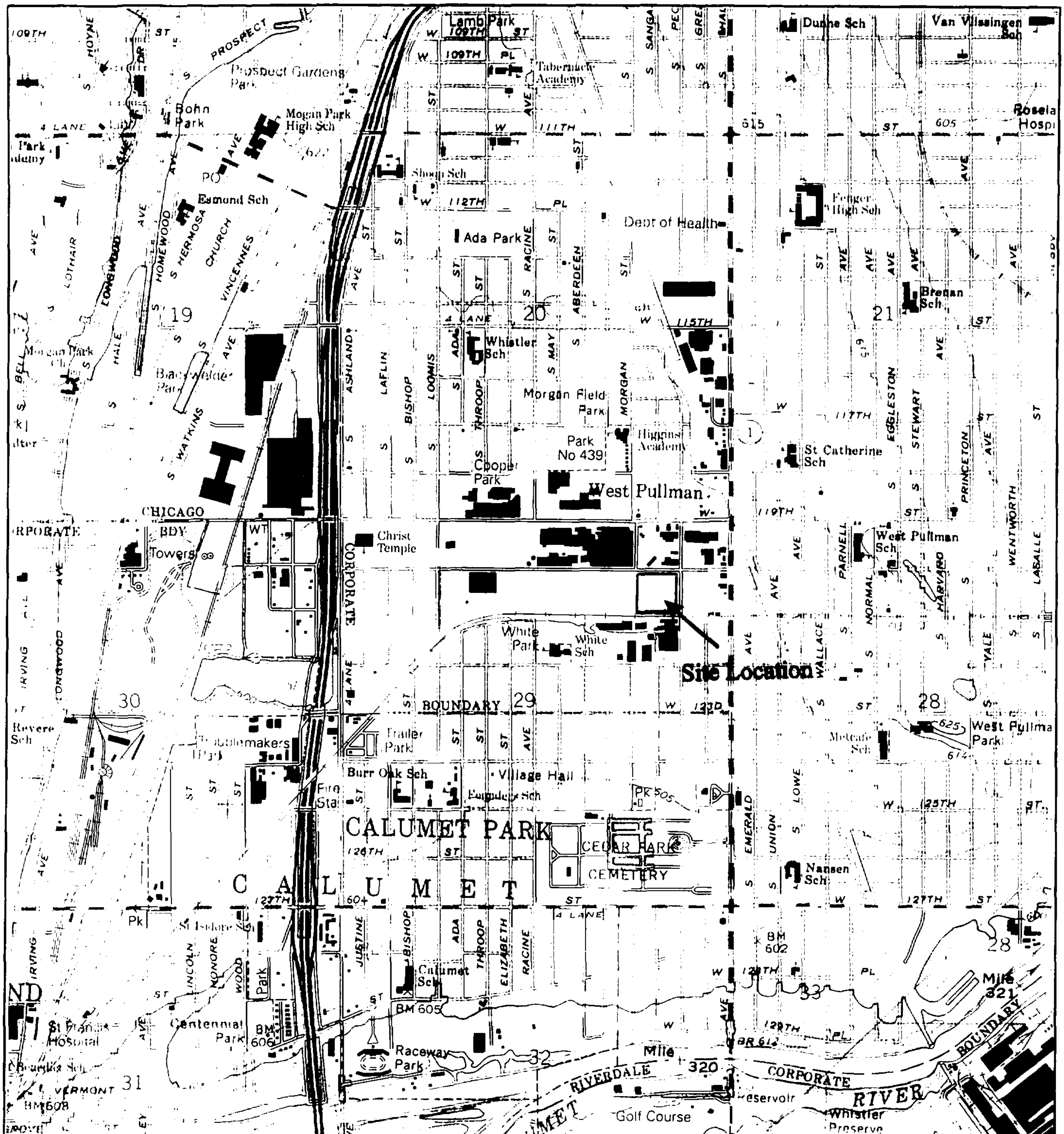
Illinois Environmental Protection Agency (IEPA, 1991). Leaking Underground Storage Tank Manual. Fall 1991.

United State Department of Agriculture, Natural Resource Conservation Service (USDA 1996). Illinois Urban Manual, A Technical Manual Designed for Urban Ecosystem Protection and Enhancement. 1995.

United States Environmental Protection Agency, (USEPA 1986). Superfund Remedial Design and Remedial Action Guidance, OSWER Directive 9355-0-4A. June 1986.

United States Environmental Protection Agency, (USEPA 1996). Administrative Order Pursuant to Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as Amended, 42 U.S.C. Section 9606(a), and Section 7003 of the Resource Conservation and Recovery Act, as Amended, 42 U.S.C. 6973. March 26, 1996.

Appendix A – Figures



Reference

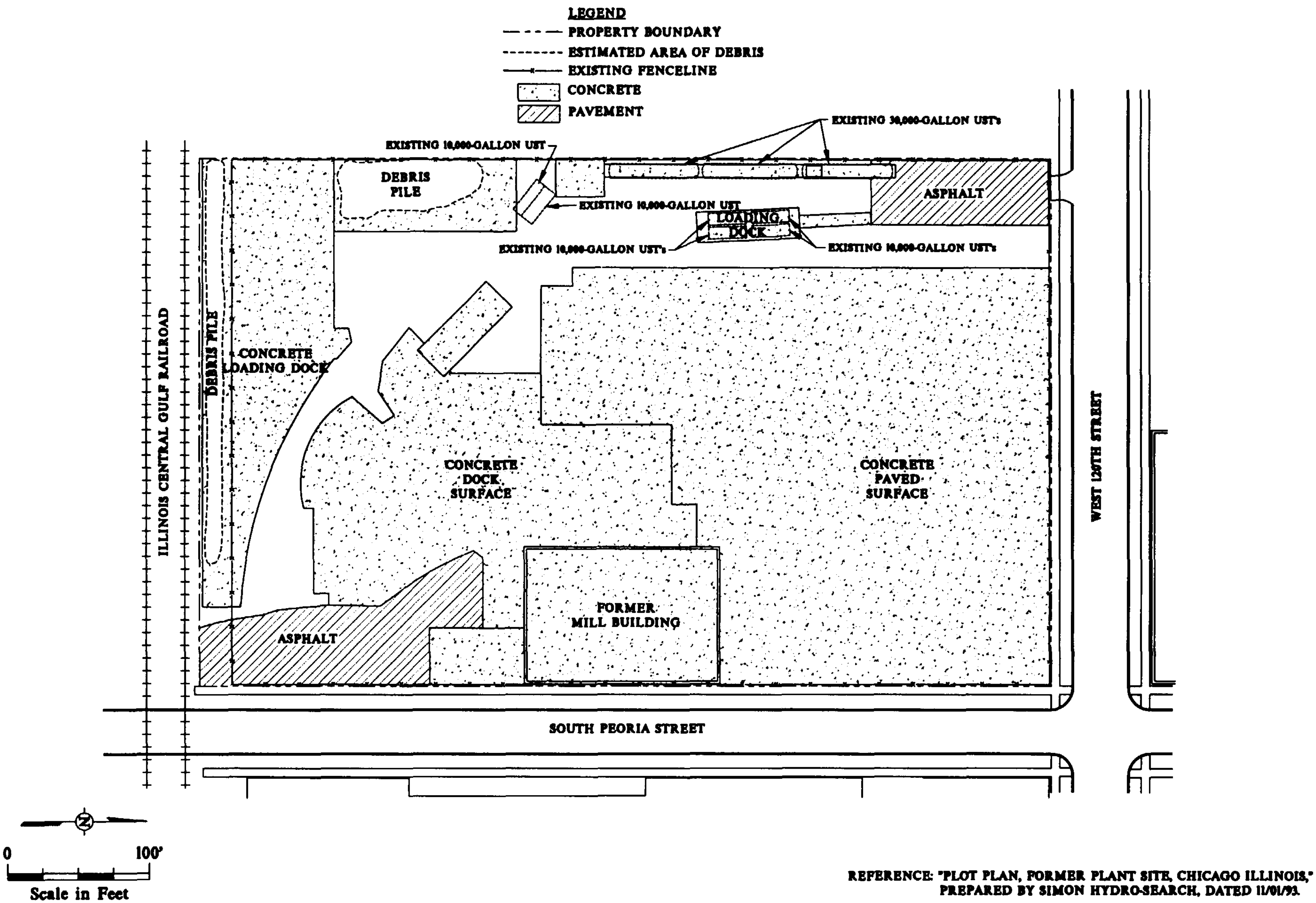
Blue Island Topographic Quadrangle
Illinois – Cook Co., US
Photorevised 1993 Scale 1:24,000

Quadrangle Location

0 2000 4000
Scale in Feet

ENVIRONMENTAL STRATEGIES CORPORATION
11911 Freedom Drive Suite 900
Reston, Virginia 20190
703-709-6500

Figure 1
Site Location
Dutch Boy Site
Chicago, Illinois



REFERENCE: "PLOT PLAN, FORMER PLANT SITE, CHICAGO ILLINOIS," PREPARED BY SIMON HYDRO-SEARCH, DATED 11/01/93.

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Figure 2
Site Layout
Dutch Boy Site
Chicago, Illinois

A0LDWG

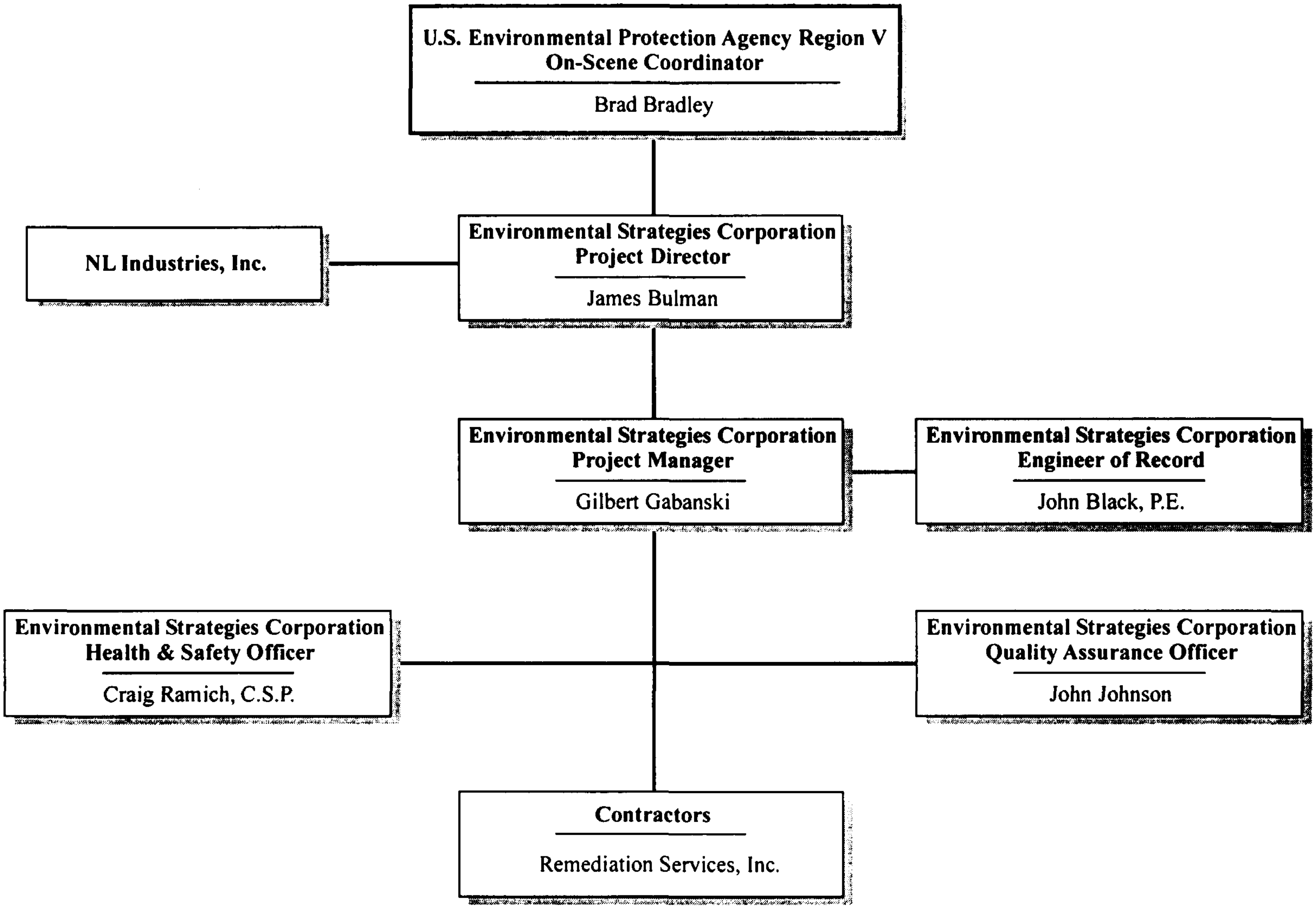

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Figure 3
Project Organizational Chart
Dutch Boy Site
Chicago, Illinois

Appendix B – Remedial Action Design Specifications

Provided Under Separate Cover

Appendix C – Remedial Action Design Drawings

Provided Under Separate Cover

Appendix D - Cost Estimate

Cost Estimate

Dutch Boy Site
Remedial Action
Chicago, Illinois

		Units		$/Unit	Alternative 4 Onsite T & D Paved and Unpaved Areas >1,400 mg/kg
1	Mobilization/Demob	3	LS	Various	$25,000.00
2	Site Preparation	1	LS	Various	$18,500.00
3	Treat Storm & Decon Water Management	If Any	Gal	$0.25	$0.00
4A	Paved Area Placement of Asphalt (3" thick)	4,848	SY	$11.50	$55,752.00
4B	Load, Transport & Dispose of Concrete	1,574	CY	$50.00	$78,700.00
5A	Excavate Waste Materials > 1,400 mg/kg	5,000	CY	$6.50	$32,500.00
5B	Onsite Treatment Soils >1,400 mg/kg	7,500	Tons	$31.50	$236,250.00
5C	Stabilizing Reagent (Est. 15% by Wt.)	1,125	Tons	$103.88	$116,865.00
5D	Transportation & Disposal (Subtitle D)	8,625	Tons	$30.00	$258,750.00
6A	UST Concrete Removal and Offsite Disposal	150	CY	$61.19	$9,178.50
6B	Offsite Disposal of Free Liquids Generated	4,500	Gal	$2.00	$9,000.00
6C	UST Removals	150,000	Gal	$0.75	$112,500.00
7	Load, Transport & Dispose of Debris Piles	850	CY	$45.00	$38,250.00
8	Place, Compact Unclassified Fill	5,637	CY	$11.21	$63,190.02
9	Place Top Soil 3"	613	CY	$25.00	$15,326.67
10	Seed & Mulch	1.5	Acre	$3,250	$4,940.00
		Subtotal Soil T &D			$1,074,702.19
11	Document Preparation	1	LS	Various	$35,000.00
12	Project Management and Oversight	1	LS	Various	$110,000.00
		Subtotal Estimate			$1,219,702.19
13	Contingency	10% Subtotal Estimate			$121,970.22
		TOTAL Estimate			**$1,341,672.41**

LS = lump sum
CY = cubic yard
SY = square yards
Gal = gallons
mg/kg = milligram per kilogram

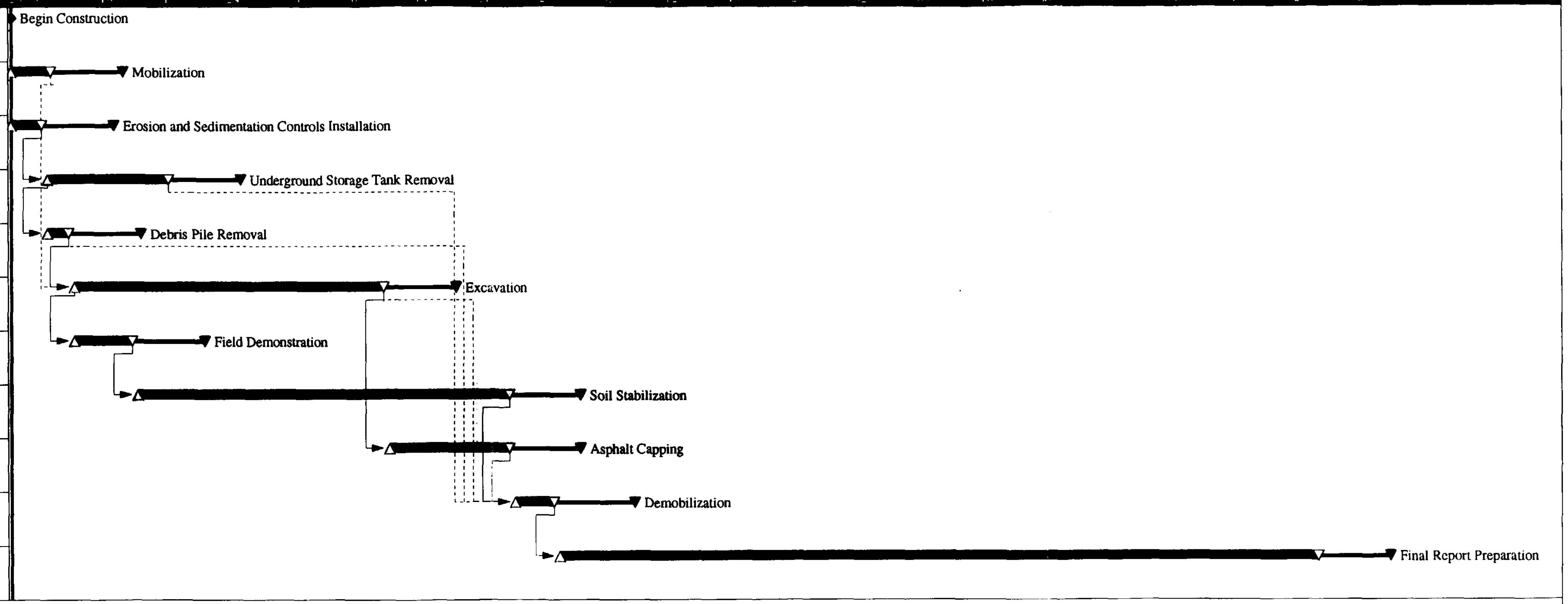
q:\excel\ircc\nl\dutchboy\projcost2.xls

Appendix E - Schedule

Project Schedule

Dutch Boy Site
Remedial Action
Chicago, Illinois

Begin Construction	0	0	30APR99 *
Mobilization	3d	3d	30APR99
Erosion and Sedimentation Controls Installation	2d	2d	30APR99
Underground Storage Tank Removal	10d	10d	04MAY99 *
Debris Pile Removal	3d	3d	04MAY99
Excavation	25d	25d	07MAY99
Field Demonstration	5d	5d	07MAY99
Soil Stabilization	30d	30d	14MAY99
Asphalt Capping	10d	10d	11JUN99
Demobilization	3d	3d	25JUN99
Final Report Preparation	60d	60d	30JUN99



- △ Early start point
- ▽ Early finish point
- Early bar
- ▼ Late finish point
- Total float bar
- Progress bar
- Critical bar
- Summary bar
- ▲ Progress point
- ▲ Critical point
- Summary point
- ◆ Start milestone point
- ◆ Finish milestone point

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Appendix F – Project Health and Safety Plan

Provided Under Separate Cover